Volunteer Lake Assessment Program Individual Lake Reports

HILLS POND, ALTON, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	1,472	**Max. Depth (m):**	13.4	**Flushing Rate (yr^{1})**	1.6
Surface Area (Ac.):	138	**Mean Depth (m):**	5	**P Retention Coef:**	0.58
Shore Length (m):	2,700	**Volume (m^{3}):**	1,894,000	**Elevation (ft):**	809

TROPHIC CLASSIFICATION

Year	Trophic class
1985	MESOTROPHIC
2005	MESOTROPHIC

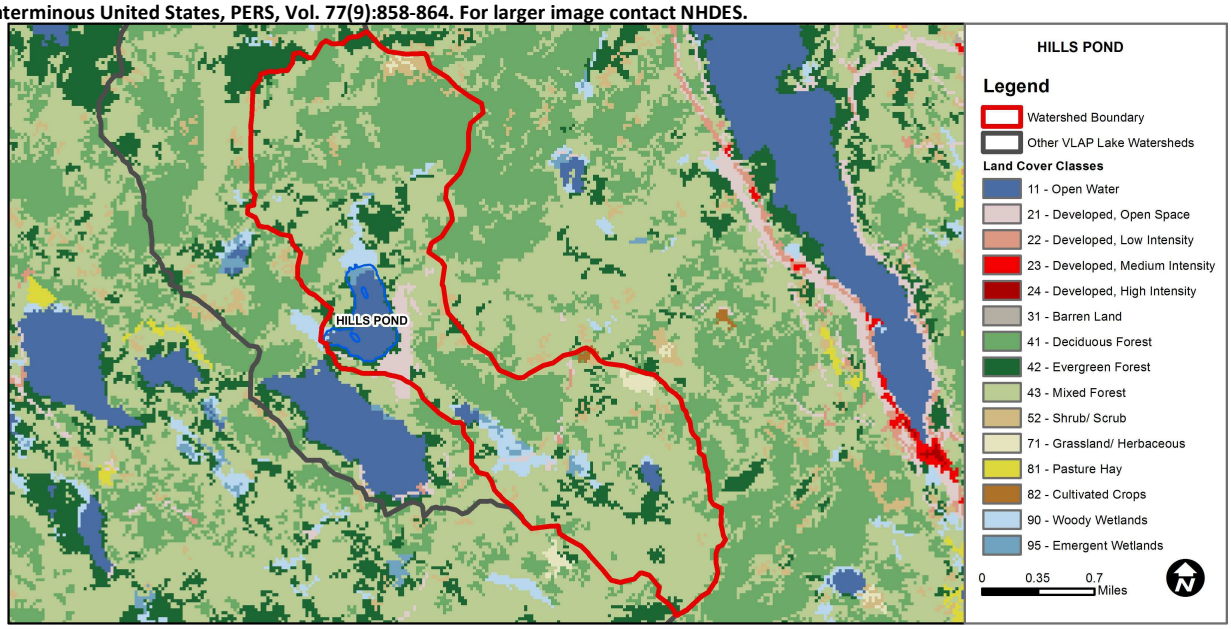
KNOWN EXOTIC SPECIES

The Waterbody Report Card tables are generated from the 2012 305(b) report on the status of N.H. waters, and are based on data collected from 2001-2011.

Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Slightly Bad	>/=5 samples and median is >threshold.
	pH	Bad	>10%, with a minimum of 2, samples exceed criteria, with 1 or more by a large margin.
	D.O. (mg/L)	Encouraging	< 10 samples and no exceedance of criteria. More data needed.
	D.O. (% sat)	Slightly Bad	>10% of samples exceed criteria by a small margin (minimum of 2 exceedances).
	Chlorophyll-a	Slightly Bad	>5 samples and median is > threshold.
Primary Contact Recreation	E. coli	Good	Geometric means < criteria; however at least 1 exceedance of the single sample criteria occurred.
	Chlorophyll-a	Good	At least 10 samples with 1 sample but < 10% of samples exceeding criteria.

WATERSHED LAND USE SUMMARY

Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.

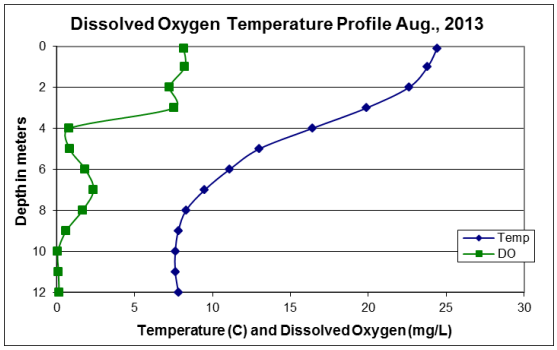


Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	3.94	Barren Land	0	Grassland/Herbaceous	0.73
Developed-Open Space	2.25	Deciduous Forest	29.6	Pasture Hay	0
Developed-Low Intensity	0.11	Evergreen Forest	8.51	Cultivated Crops	0.12
Developed-Medium Intensity	0	Mixed Forest	48.39	Woody Wetlands	3.24
Developed-High Intensity	0	Shrub-Scrub	2.36	Emergent Wetlands	0.75

VOLUNTEER LAKE ASSESSMENT PROGRAM INDIVIDUAL LAKE REPORTS
HILLS POND, ALTON, NH
2013 DATA SUMMARY

OBSERVATIONS AND RECOMMENDATIONS (*Refer to Table 1 and Historical Deep Spot Data Graphics)*

- **CHLOROPHYLL-A:** Chlorophyll levels were elevated in July and August and above average for the pond. Historical trend analysis indicates highly variable chlorophyll levels between years.
- **CONDUCTIVITY/CHLORIDE:** Conductivity and chloride were low and much less than the state medians. Historical trend analysis indicates relatively stable epilimnetic conductivity with moderate variability between years.
- **E. COLI:** E. coli levels were much less than the state standards for public beaches and surface waters.
- **TOTAL PHOSPHORUS:** Epilimnetic phosphorus levels were slightly elevated in July potentially due to low water levels concentrating nutrients. Historical trend analysis indicates stable epilimnetic phosphorus with low variability between years. Metalimnetic phosphorus was low and hypolimnetic phosphorus increased slightly in August potentially due to the release of phosphorus from bottom sediments under anoxic (no oxygen) conditions. Tributary phosphorus levels were average and stable.
- **TRANSPARENCY:** Transparency was good and was slightly better than the state median. Historical trend analysis indicates significantly decreasing (worsening) transparency since monitoring began.
- **TURBIDITY:** Epilimnetic turbidity was slightly higher in July potentially due to the elevated algal growth. Hypolimnetic turbidity was slightly elevated in August potentially due to the release of organic compounds from bottom sediments under anoxic conditions. North Inlet turbidity was slightly elevated in August when tributary flow was high.
- **PH:** Deep spot and tributary pH levels were generally less than the desirable range 6.5 – 8.0 units.
- **RECOMMENDED ACTIONS:** A beaver dam was removed from the Outlet in July resulting in lower water levels. When beaver dams are removed this could result in an increase of nutrients and organic material flowing downstream into Sunset Lake. Recommend installing a beaver pipe through the dam structure to allow for consistent water flow out of Hills Pond. UNH Cooperative Extension offers information on beaver control and the construction of beaver pipes. The significant early summer rainfall may have contributed nutrients necessary to fuel the excess algal growth and the removal of the beaver dam may have concentrated these nutrients when water levels were low. Maintaining a regular flow from the Outlet could assist in managing water levels so there is less fluctuation.



NH Water Quality Standards: Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.
Chloride: < 230 mg/L (chronic)
E. coli: > 88 cts/100 mL – public beach
E. coli: > 406 cts/100 mL – surface waters
Turbidity: > 10 NTU above natural level
pH: 6.5-8.0 (unless naturally occurring)

NH Median Values: Median values for specific parameters generated from historic lake monitoring data.
Alkalinity: 4.9 mg/L
Chlorophyll-a: 4.58 mg/m^3
Conductivity: 40.0 uS/cm
Chloride: 4 mg/L
Total Phosphorus: 12 ug/L
Transparency: 3.2 m
pH: 6.6

Table 1. 2013 Average Water Quality Data for HILLS POND

Station Name	Alk.	Chlor-a	Chloride	Cond.	E. Coli	Total P	Trans.		Turb.	pH
	mg/l	ug/l	mg/l	uS/cm	#/100ml	ug/l	m		ntu	
							NVS	VS		
East Inlet				27.8	10	11			0.51	6.58
East Inlet Upstream				29.2	10	15			0.49	6.61
Epilimnion	3.70	8.64	3	25.8		12	3.38	3.63	0.87	6.03
Metalimnion				33.4		9			0.76	5.84
Hypolimnion				36.0		16			2.31	5.81
Main Beach					7					
North Inlet				21.5		14			1.52	6.23
Outlet				21.1	10	13			0.54	5.86
South Inlet				20.1		13			0.61	5.81

HISTORICAL WATER QUALITY TREND ANALYSIS

Parameter	Trend	Explanation	Parameter	Trend	Explanation
pH	Degrading	Data significantly decreasing.	Chlorophyll-a	Stable	Trend not significant; data highly variable.
Conductivity	Stable	Trend not significant; data moderately variable.	Transparency	Degrading	Data significantly decreasing.
			Phosphorus (epilimnion)	Stable	Trend not significant; data show low variability.